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AH285

Hall-Effect Smart Fan Motor Controller

■ Features

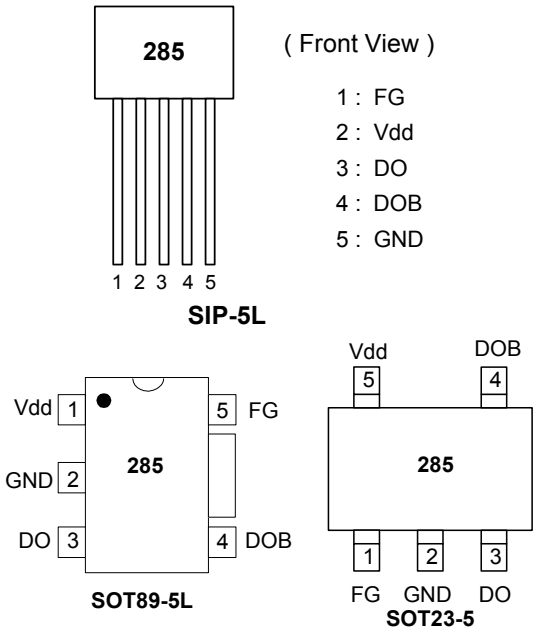
- On chip Hall sensor
- Rotor-locked shutdown
- Automatically restart
- Frequency generator (FG) output
- Built-in Zener protection for output driver
- Operating voltage: 3.8V~20V
- Output current: $I_{O(AVE)}$ = 500mA for SIP-5/SOT89-5
- Output current: $I_{O(AVE)}$ = 400mA for SOT23-5
- Package: SIP-5L, SOT23-5L, SOT89-5L

■ General Description

AH285 is a monolithic fan motor controller with Hall sensor's capability. It contains two complementary open-drain transistors as motor coil drivers, automatic lock current shutdown, and recovery protections. Additional, frequency generator (FG) output is for speed detection relatively.

To avoid coil burning, rotor-lock shutdown detection circuit shut down the output driver if the rotor is blocked and then the automatic recovery circuit will try to restart the motor. This function repeats while the rotor is blocked. Until the blocking is removed, the motor recovers running normally.

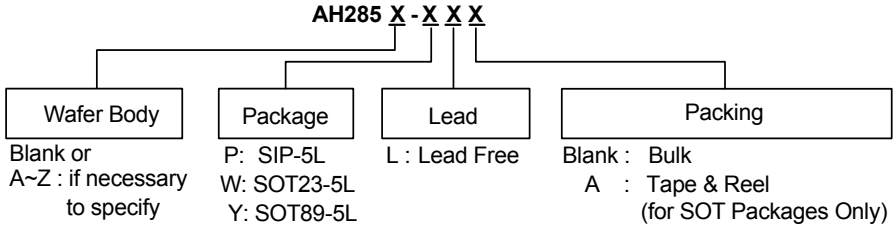
■ Pin Configuration



■ Pin Descriptions

Symbol	Description
FG	Frequency generation
Vdd	Input power
DO	Output pin
DOB	Output pin
GND	Ground

■ Ordering Information



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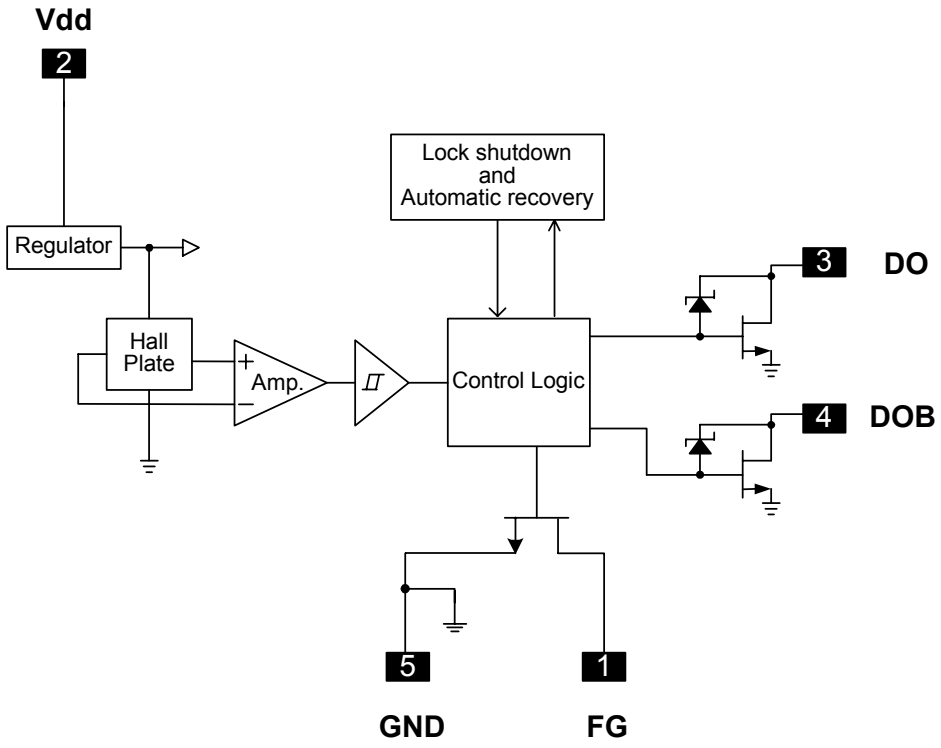
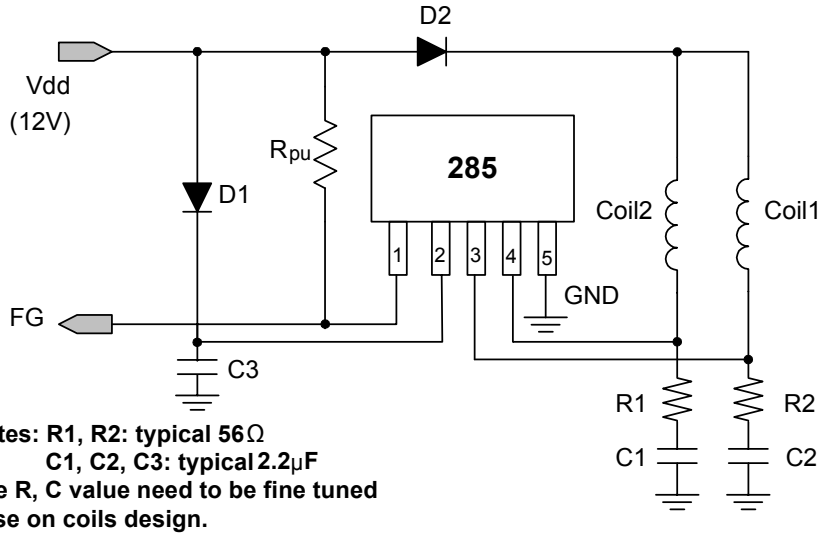
■ Block Diagram (SIP5)



■ Typical Application Circuit (SIP5)



Notes: R1, R2: typical 56Ω
C1, C2, C3: typical 2.2μF
The R, C value need to be fine tuned base on coils design.

12V DC Brush-less Fan with FG output function

■ Absolute Maximum Ratings (Ta = 25°C)

Characteristics	Symbol		Rating	Unit
Supply Voltage	Vdd		24	V
Output Current	$I_{O(AVE)}$	SIP5/SOT89-5	500	mA
		SOT23-5	400	
	$I_{O(PEAK)}$		700	
Power Dissipation	P_D	SIP5	550	mW
		SOT23-5	230	
		SOT89-5	800	
Operating Temperature	Topr		-40 ~ 100	°C
Storage Temperature	Tstg		-55 ~ 150	°C
Maximum Junction Temp.	Tj		150	°C
Thermal Resistance	θjc	SIP5	227	°C/W
		SOT23-5	543	
		SOT89-5	156	

■ Electrical Characteristics (Ta = 25 °C, Vdd = 12V, unless otherwise notice)

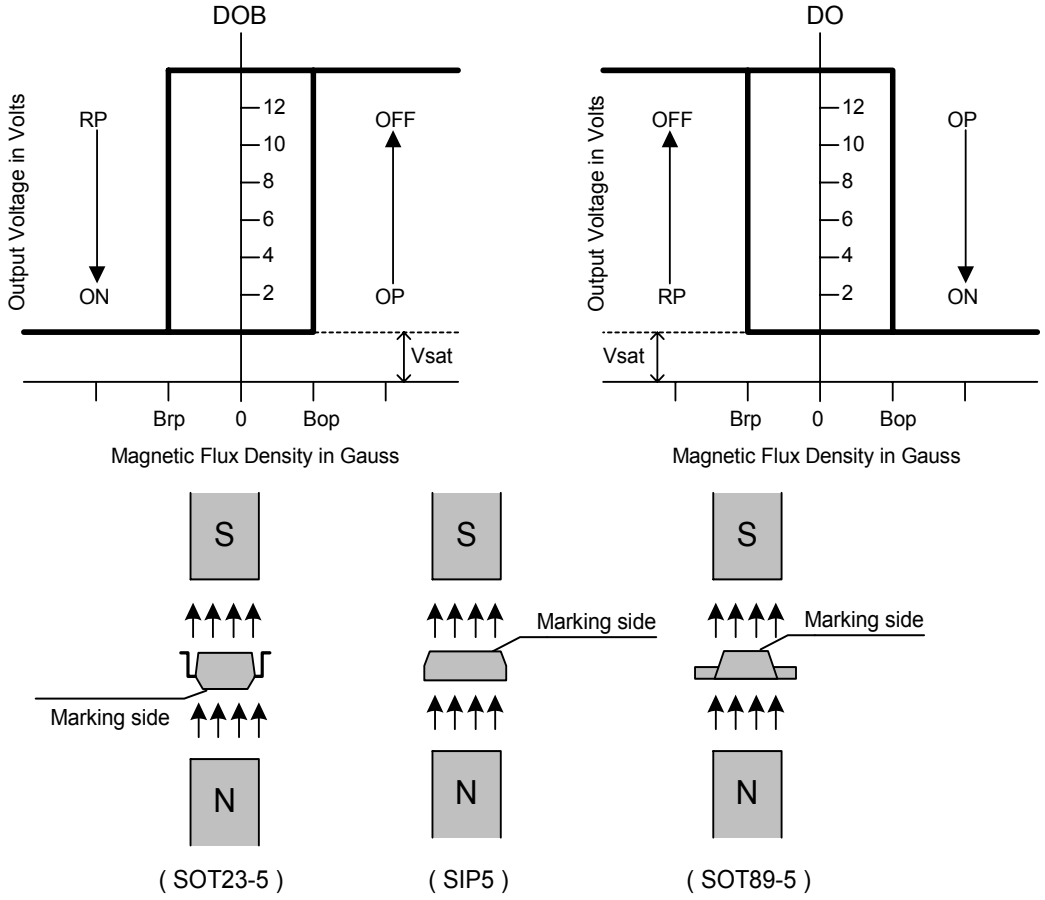
Characteristics	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply Voltage	Vdd	Operating	3.8	-	20	V
Supply current	Idd	Operating	-	2	4	mA
Output Leakage Current	Ioff	V_{OUT}=24V	-	< 0.1	10	μA
Locked Protection On	Tlrp-on		0.4	0.5	0.6	Sec
Locked Protection Off	Tlrp-off		2.4	3	3.6	Sec
Output saturation voltage	$V_{OUT(sat)}$	I_O=300mA	-	375	500	mV
		I_O=500mA	-	625	900	
Output On resistance	Rds(on)	I_O=300mA	-	1.25	1.67	ohm
FG output Vds	Vol	I_O=10mA	-	0.5	-	V
Output Zener-breakdown Voltage	Vz		35	42	60	V

■ Magnetic Characteristics (Ta = 25 °C, Vdd = 12V, unless otherwise specified)

(1mT=10 Gauss)

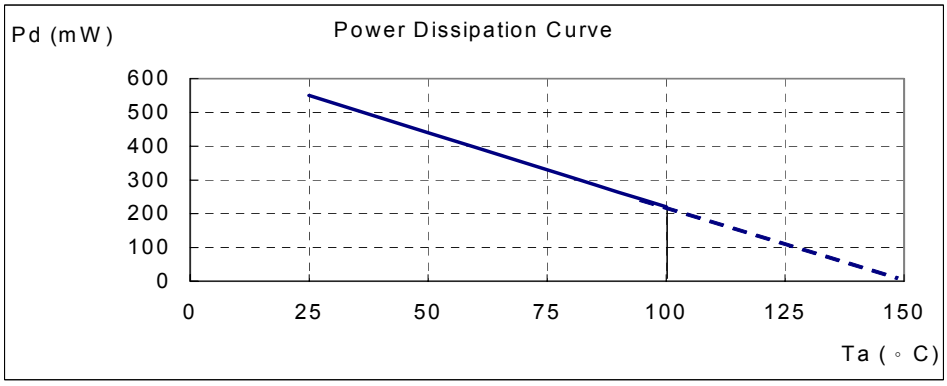
Characteristics	Symbol	Min.	Typ.	Max.	Unit
Operate Point	Bop	10	30	60	Gauss
Release Point	Brp	-60	-30	-10	Gauss
Hysteresis	Bhy	-	60	-	Gauss

■ Operating Characteristics



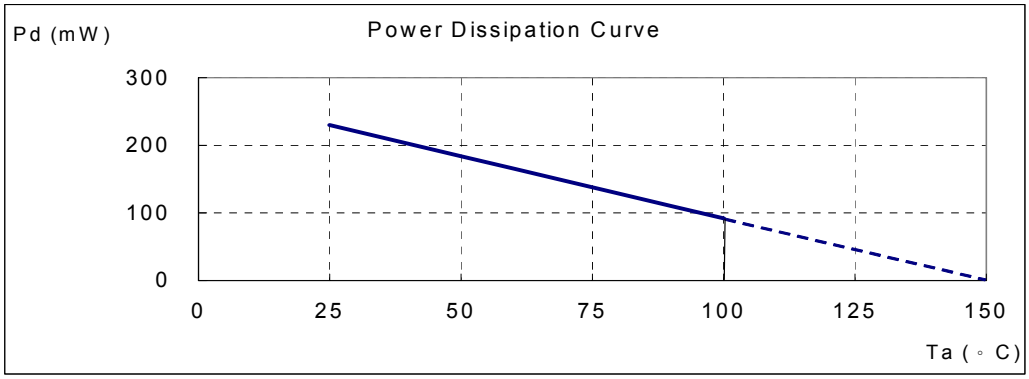
■ Performance Characteristics (SIP5)

Ta (°C)	25	50	60	70	80	85	90	95	100
Pd (mW)	550	440	396	352	308	286	264	242	220
Ta (°C)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**150**
Pd (mW)	198	176	154	132	110	88	66	44	0



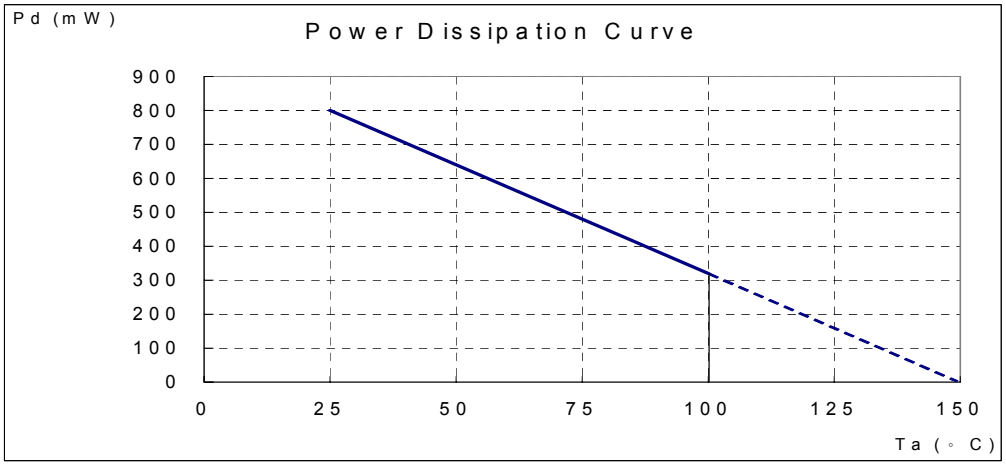
■ Performance Characteristics (SOT23-5)

Ta (°C)	25	50	60	70	80	90	100	110	120	130	140	150
Pd (mW)	230	184	166	147	129	110	92	74	55	37	18	0



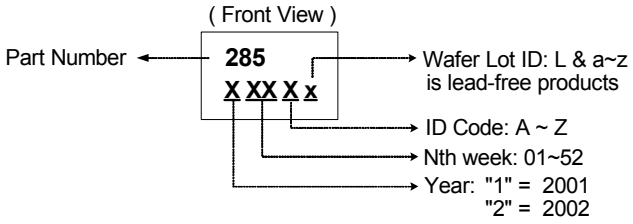
■ Performance Characteristics (SOT89-5)

Ta (°C)	25	50	60	70	75	80	85	90	95	100
Pd (mW)	800	640	576	512	480	448	416	384	352	320
Ta (°C)	**105**	**110**	**115**	**120**	**125**	**130**	**135**	**140**	**145**	**150**
Pd (mW)	288	256	224	192	160	128	96	64	32	0

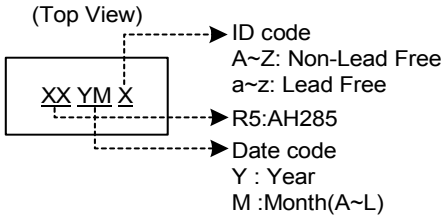


■ Marking Information

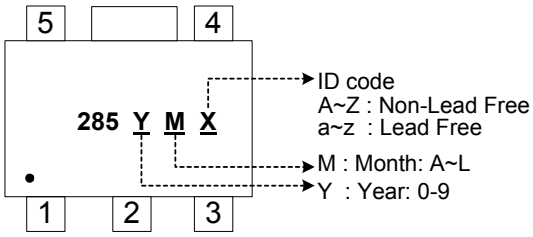
(1)SIP-5L



(2)SOT23-5L

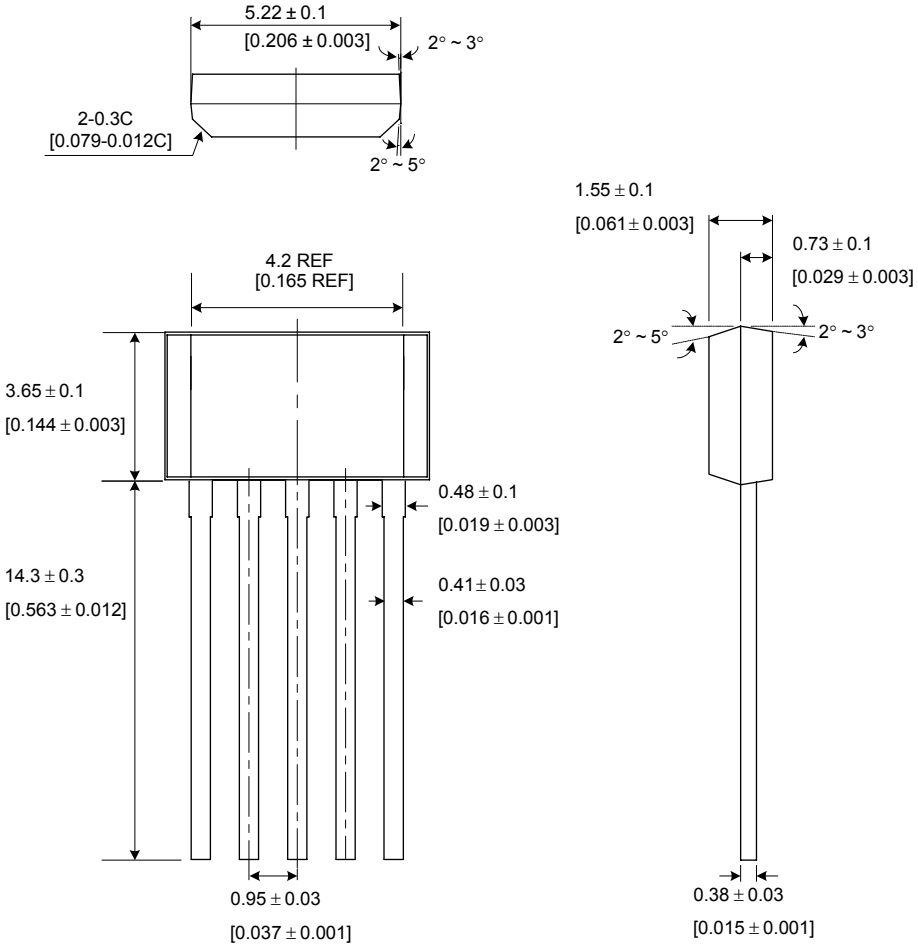


(3)SOT89-5L

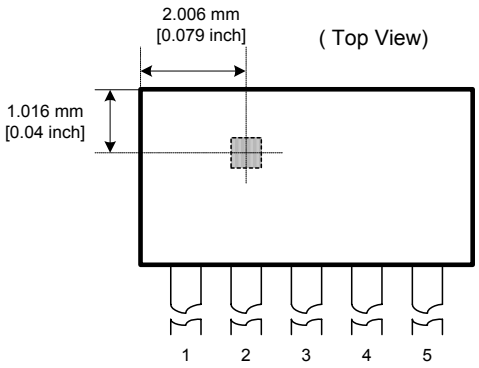


■ Package Information

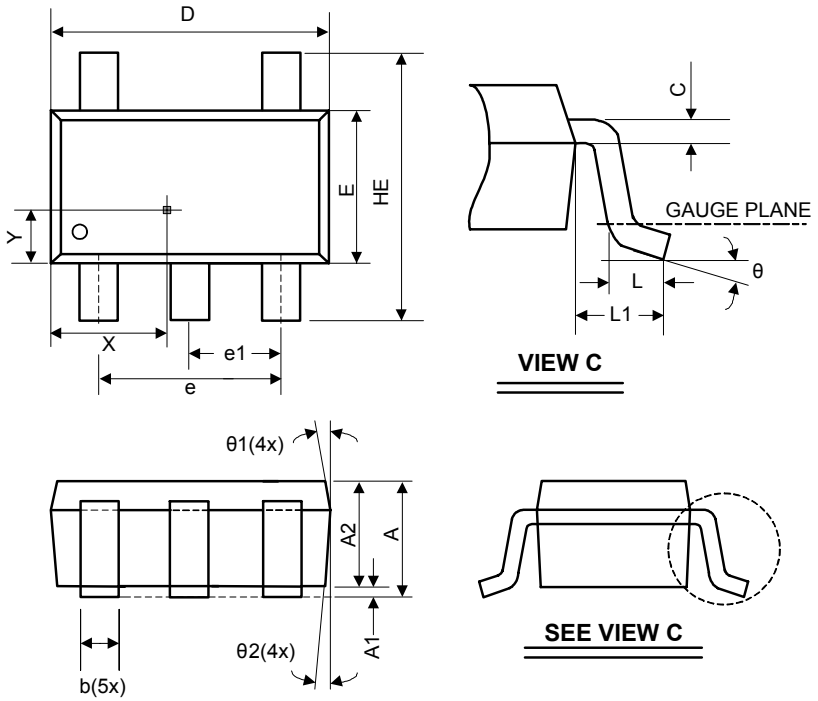
(1)Package type: SIP-5L (unit: mm / [inch])



■ Location of Sensing Point

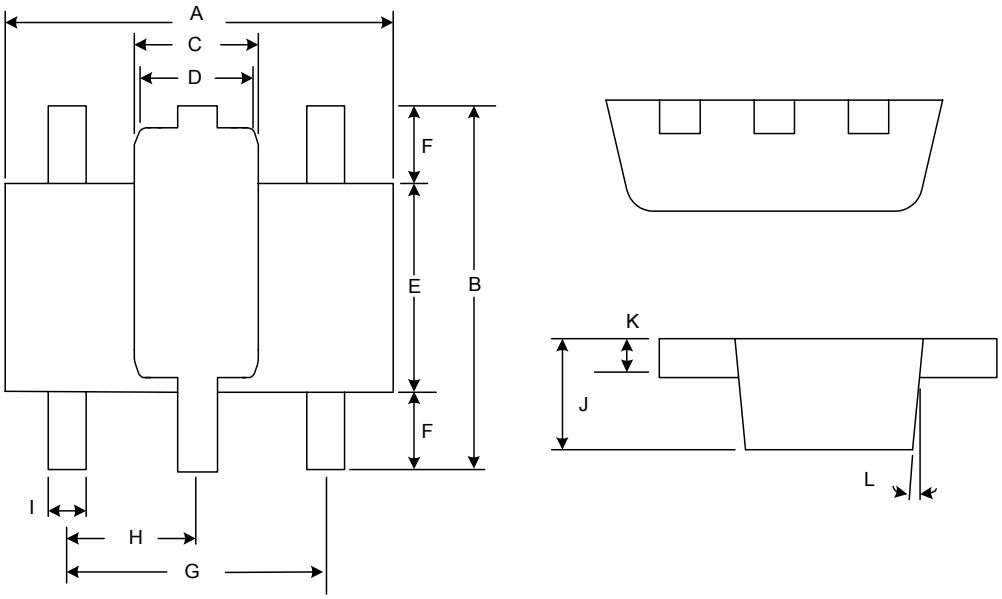


(2) SOT23-5L

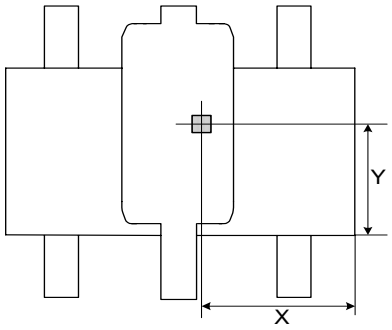


Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.05	-	1.35	0.041	-	0.053
A1	0.05	-	0.15	0.002	-	0.006
A2	1.00	1.10	1.20	0.039	0.043	0.047
b	0.25	-	0.50	0.010	-	0.020
C	0.08	-	0.20	0.003	-	0.008
D	2.70	2.90	3.00	0.106	0.114	0.118
E	1.50	1.60	1.70	0.059	0.063	0.067
HE	2.60	2.80	3.00	0.102	0.110	0.118
L	0.30	-	0.60	0.012	-	0.024
L1	0.50	0.60	0.70	0.020	0.024	0.028
e	1.80	1.90	2.00	0.071	0.075	0.079
e1	0.85	0.95	1.05	0.033	0.037	0.041
θ	0°	5°	10°	0°	5°	10°
θ1	3°	5°	7°	3°	5°	7°
θ2	6°	8°	10°	6°	8°	10°
X	-	1.067	-	-	0.042	-
Y	-	0.432	-	-	0.017	-

(3) Package type: SOT89-5L



Package Sensor Location



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	4.40	4.50	4.60	0.173	0.177	0.181
B	4.05	4.15	4.25	0.159	0.163	0.167
C	1.50	1.60	1.70	0.059	0.063	0.067
D	1.30	1.40	1.50	0.051	0.055	0.059
E	2.40	2.50	2.60	0.094	0.098	0.102
F	0.80	-	-	0.031	-	-
G	3.00 Ref.			0.118 Ref.		
H	1.50 Ref.			0.059 Ref.		
I	0.40	0.46	0.52	0.016	0.018	0.020
J	1.40	1.50	1.60	0.055	0.059	0.063
K	0.35	0.39	0.43	0.014	0.015	0.017
L	5^o Typ.			5^o Typ.		
X	-	1.90	-	-	0.075	-
Y	-	1.65	-	-	0.065	-